Online Assessment in Higher Education during Pandemic Outbreak: Challenges and Effective Practices

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ABSTRACT

Educational activities have been shifting to online mode due to school closures during the Covid-19 pandemic. Thus, the online mode of education introduces new ways of teaching and assessment. Both formative and summative assessments have been conducted online, which proved to be challenging and ineffective. Educational stakeholders are in trouble due to this transition of education. Considering this very important issue, this research is planned to investigate the challenges and possible effective practices of assessment in higher education. A qualitative research approach was adopted to collect data from university teachers through a semi-structured interview guide. Thirty teachers were involved in this study through convenient sampling techniques. All the collected data were analyzed by adopting thematic analysis techniques. The findings identified the following key challenges for teachers: (a) poor formative assessment due to less participation of students in online classes; (b) poor quality of learning management system and other applications to get connected with students; (c) students cheat during exams and submit plagiarized work. As to exploring effective practices, teachers suggested the following, (a) exams should be based on an open-book strategy but teachers and students should be prepared for this; (b) the university should invest in developing the infrastructure to teach online; (c) the university should develop a policy to handle malpractices of students. The results are also discussed with the help of available research.

Keywords: *Online assessment; Covid-19; Qualitative research; Thematic analysis; Effective practices.*

INTRODUCTION

The shift from traditional learning to online learning mode caused challenges for academia (Joshi, Vinay & Bhaskar, 2020). All the educational stakeholders remained uncertain about this transitory

academic environment. The major problem is due to the lack of technological infrastructure for this mode of learning (Zhang et al., 2020). The situation occurred in the middle of the academic year where teachers were completely shocked and paralyzed to shift the whole program to online learning without preparation and training (Lederman, 2020). Thus, various challenges came up due to this transition of education (Crawford, Butler-Henderson, Rudolph, & Glowatz, 2020). Initially, academia was relying on the existing system to run the routine but their responsibilities were also increased. They started developing the policies, related infrastructure and implementation of new learning modes on an urgent basis. Nevertheless, academia immediately accepted the need for school closure and shifted to online mode to limit the spread of Covid-19 (Kaur, 2020). The shift to a new educational system was not new for many developed countries as they were already running a partial part of their teaching and learning through online systems, but the problem and challenges arise for those countries who never planned such initiatives and have never been trained for such situations.

Especially, when it comes to conducting assessment, it is more challenging than other instructional activities. Online assessment has been crucial in the education sector (Khairil & Mokshein, 2018) and the efficacy of online education can only be assured through effective assessment. In online learning mode, teachers are lacking in virtual teaching processes. Thus, they are unable to create effective assessment strategies which give leverage to students to use unfair means to pass the exam or score higher in contrast to conventional learning mode (Verma, Campbell, Melville, & Park 2020). Moreover, planning an online course is different than a conventional course. Such planning requires constructive alignment, as Biggs (2003) suggested aligning the instructional methods and assessment strategies with learning objectives to achieve the educational goals. In online mode, this enables teachers to get exposure to new assessment methods (Bennett et al., 2017). This requires thorough training to design online assessment, otherwise it will be highly risky and challenging for the whole education process (Abubakar & Adeshola, 2019). In a developing country like Pakistan where the educational system is already under reform, it suffered badly due to this pandemic. There are only a few universities that could immediately cope with the situation (Abbas, Ahmed, Khalid, & Yasmeen, 2017).

Researcher Gratz and Looney (2020) linked this situation to two key challenges. First, it is a matter of readiness and adoption of an online mode of education; secondly, external factors play its role in successfully launching the online education delivery, e.g., technological infrastructure and related facilities. Next to these factors, there are other key challenges as well. For example, the inconvenience of working from home, ethical challenges both from teachers and students, cheating and plagiarism, using unfair means, non-serious behavior of students, low participation in online classes etc. (Basilaia, & Kvavadze, 2020). Nevertheless, Covid-19 introduces a new challenge to the educational world which cannot be addressed in a short time. Taking into account the above-mentioned challenges in online assessment, we planned this study to investigate the particular challenges which university teachers faced during online assessment of their students. Moreover, we will also explore the suggestions and effective practices from teachers in view of improving online assessment in higher education.

LITERATURE REVIEW

Shifting from conventional to online teaching and learning mode invited a lot of challenges and problems for higher education (Crawford, Butler-Henderson, Rudolph, & Glowatz, 2020). This shift was made during Covid-19 when the whole educational system was shut down and then

gradually restored the educational activities in the shape of online and to some extent on campus activities (Adedoyin & Soykan, 2020). The whole educational community is witness of the fact that both conventional and online education modes have their own pros and cons. The effectiveness of both is challenging, but it has become more challenging in online mode due to the absence and a lack of technological infrastructure (Bacow, 2020).

Online Assessment

The concept of online assessment generally goes with distance education and e-learning. Online learning cannot be separated from assessment. Distance educational programs are completely based on online teaching, learning and assessment. This shows there are certain ways to conduct online assessment (Wang, Chiu, Lin, & Chou, 2013). Online assessment is very practical in nature and can be conducted even without paper-and-pencil, marking and scoring can be done automatically and online, even a teacher can give immediate online feedback in written and verbal form (Khairil & Mokshein, 2018; Albee, 2015). However, assessment has to be reliable either in conventional or online mode. Authors Fiseha, Adeel, Khalit and Khidhir (2020) highlighted the following criteria which should be fulfilled to make assessment reliable and valid e.g., (1) Assessment should be in line with the instructional objectives (Hsiao & Watering, 2020) (2) Assessment should be reliable to ensure the fairness, transparency and honesty. There should be a proper system to identify malpractices in assessment, specifically in online mode (Hsiao &Watering, 2020). (3) Assessment should be clear and specific to avoid ambiguities, since the examinees are away on online assessment, so students cannot have the opportunity to get clarification from the respective teachers thus all the requirements should be clear and specified on the question papers. Moreover, if assessment is based on certain online applications and software, their work and availability should be made sure for every student (Luo et al, 2017). Technological advancements also introduce the concept of proctored exam, where the instructor or an approved examiner can invigilate the exam (Rutgers, 2020).

Challenges in Online Assessment

Technology adaptation in education is an inevitable fact in this era. All the organizations, including higher education, are increasingly adopting technology to run their educational functions smoothly. However, higher education was not ready for this huge shift to online learning and they never planned and allocated funding for such initiatives (Abbas, Ahmed, Khalid, & Yasmeen, 2017). After the countrywide lockdown, government and higher education officials started initiating and developing applications to facilitate learners at the doorstep. Nevertheless, it was not an easy, viable and affordable system for all the institutions due to many unavoidable challenges (Ali, 2020). Following assessment challenges obstruct the functioning of online learning, weak and poor technological infrastructure, lack of training of teachers and students, low participation of students in online classes, lack of technical support from IT personnel, lack of ICT resources both at teachers and students' ends, mismatch between instructional objectives and assessment activities, weak assessment strategies, poor formative assessment etc. (Arora & Srinivasan, 2020). Following are the details of these challenges:

Feasibility of the Technological Infrastructure

Rennie and Morrison (2013) highlighted the feasibility and development of technological infrastructure as a major challenge for educational institutions. In the case of students, they cannot afford the electronic gadgets: laptops, tabs, and computers with high speed internet and the

required bandwidth does not allow students to get connected with their teachers. On the institutional end, the sudden shift paralyzed educational institutes to invest the huge amount of funds in developing online teaching and learning systems. Thus, for both key stakeholders, it was quite a hard challenge to achieve educational objectives (Kebritchi, Lipschuetz & Santiague, 2017).

Technical Support and System Failure

Since universities do not have a proper learning management system and require staff. It is often challenging for them if the system fails or any technical error occurs, especially during an assessment. Due to lack of expertise and a weak system, it is often waste a lot of time during exams and other assessment activities. This gives leverage to students to take benefit from these failures and technical errors. Of course, this will affect the overall efficiency and effectiveness of assessment (Bennett et al., 2017). Authors Fiseha et al., (2020) suggested planning preventive measures to reduce such factors, but all depend on sufficient investment.

Readiness of Teachers

Gülbahar and Adnan (2020) stated that conventional teachers are not ready for this shift to teach through online mode. In fact, they were not trained for an online mode of teaching but now they cannot escape it, thus either way they have to perform (Yates, 2017). Although many institutes immediately developed their systems or updated their existing system, yet there are still many left behind. The World Bank (2020) also stresses the need for teachers' readiness and training for efficient and effective online delivery of education.

Challenges in Online Assessment Activities

The purpose of higher education is to facilitate students with quality education. For this, the quality of assessment plays a key role in students' effective learning (Okada, Mendonca, & Scott, 2015). As mentioned elsewhere, online teaching and learning has its own planning and strategies. Learning objectives, instructional activities and assessment should be aligned. Since educators do not plan their courses in view of this emergency situation, it is hard to achieve the educational objectives in their true spirit. For example, if teachers planned to conduct a quiz in class and design a rubric to give them feedback, now they have to do all these activities online. And for this, they must be properly trained and prepared to conduct it successfully (Page & Cherry, 2018). Online assessment cannot be planned on lower order thinking because it cannot judge the abilities and achievement of students, and it has to be planned on higher order thinking in the shape of an open book exam and constructive knowledge, where students can be challenged on the basis of their learned knowledge (Myyry & Joutsenvirta, 2015). However, this is not the case in pandemic situations.

Formative Assessment Activities

Formative assessment includes a variety of activities e.g., class participation, presentations, assignments, quizzes, discussions, role playing, tests etc. (Ragusa & Crampton, 2018). In the online mode of education, teachers have to plan all these activities online to achieve the learning objectives (Boton & Gregory, 2015). This calls for planning and training to creating such activities online, and keeping in view the cheating and malpractices of students. Above all, since online assessment is remote, thus it has to be free from ambiguities and technical errors to avoid confusions and delays in results (Sangster et al., 2020).

Handling with Malpractices

Well-planned institutional policies and teachers' training can reduce malpractices both at teachers' and students' end. Promoting academic honesty and teachers' integrity is the prime responsibility of teachers in academia (Levine & Pazdernik, 2018). Institutions should develop a system to validate the assessment, practical activities, assignments, quizzes, research papers and theses to maintain quality standards and avoid malpractices. A weak online system of education could enhance the opportunities for malpractices, which can badly affect the quality of education (Sangster et al., 2020).

Effective Assessment Practices in Online Mode of Education

Every attempt to overcome these challenges will move the institute towards developing effective practice. However, this is a gradual process and requires investment, skill and efforts to establish a proper system for delivery of quality education. There are certain universities around the globe working in online mode since ages and committed for providing quality education. These include national and international names, e.g., MIT University, Harvard University, Open University of the Netherlands, Stanford University, University of California and, at national level, Virtual University, Comsats University, Allama Iqbal Open University, and Agha Khan University. Institutes of higher education should learn from these best practiced universities to develop an efficient and effective system of education.

Research objectives

This research was designed on the following objectives:

- To investigate the key challenges in online assessment faced by university teachers during a pandemic outbreak;
- To explore the effective strategies of teachers to improve online assessment during a pandemic outbreak.

Research questions

Based on the research objectives, the following research questions were designed:

- What are the key challenges in online assessment faced by university teachers during a pandemic outbreak?
- What are the effective strategies to improve online assessment during a pandemic outbreak?

RESEARCH METHODOLOGY

Procedure

This research intends to study the challenges and effective practices in online assessment in higher education during the recent pandemic outbreak. A qualitative research survey was conducted to collect data from university teachers. A semi-structured interview questionnaire was designed to collect data from university teachers. Interviews were conducted with each individual participant. All the interviews were stored for verbatim analysis. Thematic analysis was performed to analyze data. An informed consent was obtained from all the participants to participate in this research and to ensure the anonymity and confidentiality of research data.

Sample

This research was conducted involving one public sector university. It is important to mention that this research was conducted during the pandemic outbreak. Thus, it was quite challenging to

collect data at a wider level. Thus, the parent university was selected to collect data from teachers. All 630 teachers were considered as the target population for this study (Bahauddin Zakariya University Multan, 2020). During the pandemic, educational institutes were partially operated and remained closed most of the time. When university opened, it allowed only last semesters to attend face-to-face classes. This reduces access. Thus, all the available teachers who were willing to participate in this research were selected on a convenient basis to participate in this survey. Thus, in total, 30 teachers from various faculties/departments participated in this research.

Measure

To meet the study objectives, a semi-structured interview questionnaire was designed to collect data from university teachers. Interview questions were designed after a thorough review of available literature on this particular phenomenon. Nine interview questions are designed for teachers to explore the key challenge that they face during an online assessment to identify the effective practices of assessment during a pandemic outbreak. The following are some sample questions: (1) What are the key challenges which you have been facing during online assessment? (2) Could you please suggest some ways to improve online assessment?

Data Collection

After targeting the sample, the last author of this manuscript contacted the concerned faculties/department heads to sought permission for data collection. Next, all the individual participants were contacted for data collection. Meetings were setup with teachers conducting the interviews. All the participants were informed about the nature and purpose of the research before the interview. Their consent to record the interviews was also sought. All the interviews were recorded verbatim for analysis. On average, each interview lasted between 10 and 20 minutes. The average age of the teachers was between 28-55 with average experience between 2-25 years. All the ethical concerns were ensured in view of data collection, storing and reporting.

Data Analysis

All the interviews were stored on a device for analysis. First, all the interviews were transcribed verbatim by the last author of this manuscript. Later, a code book was developed to get familiar with the collected data and to perform thematic analysis. Next, certain codes were merged and refined to generate popular themes. Then the first and last authors of this manuscript mutually reviewed and refined the themes. Lastly, all the themes were arranged according to the questions to start reporting with the help of related interview chunks. The reliability of the themes was also calculated by the first and last author and found reasonable according to the reported benchmarks.

RESULTS

The following section will report the results of thematic analysis inferred from the interviews of university teachers. We will present the results in line with interview questions and related themes. After the general introductory questions, we present the first questions: What are the key challenges which you have been facing during online assessment? The following themes emerged in response to these questions:

Challenges Faced in Online Assessment

This was the main question linked to our first research objectives. The following four themes were identified in relation to this question. In total, 128 codes were identified presenting these themes. Percentages of themes were calculated for better presentation of qualitative findings. (a) Poor quality of online education (56.25%);(b) Inefficient assessment (19.53%); (c) Difficulties in affordability (13.28%); (d) Need for efficient and user-friendly LMS (10.94%). We will present the interview excerpts only in relation to the highest occurring themes. The majority of the teachers highlighted that the quality of teaching was very poor during online education. They highlighted many key reasons for this low quality of education' e.g., poor infrastructure for online classes at both teachers' and students' ends. Thus, poor communication, lack of seriousness and low participation in online classes were the major causes of low quality of education. A teacher explained this situation in the following way:

> *"Honestly, both teachers and students are not read for the online mode of education. The participation in online class is very less due to internet connection and available infrastructure." (Teacher-09)*

Since the online classes are not regular and efficient, how can online assessment be efficient and effective? Many key reasons were shared by the respondents, e.g., exam patterns, cheating, investigation etc. These factors raise key concerns about the quality of online assessment. The following respondent shared:

> *"Online assessment is one of the crucial challenges of online learning. It is hard to ensure transparency in online assessments. Students use a number of ways to get help from peers and experts in the exam. Since we teachers cannot see them, so we are unable to stop this element." (Teacher-18)*

Similarly, teachers also reported difficulty managing connections and buying related devices for online study. Sometimes they face compatibility issues with the applications with their gadgets. The following graph represents the percentages of these themes:

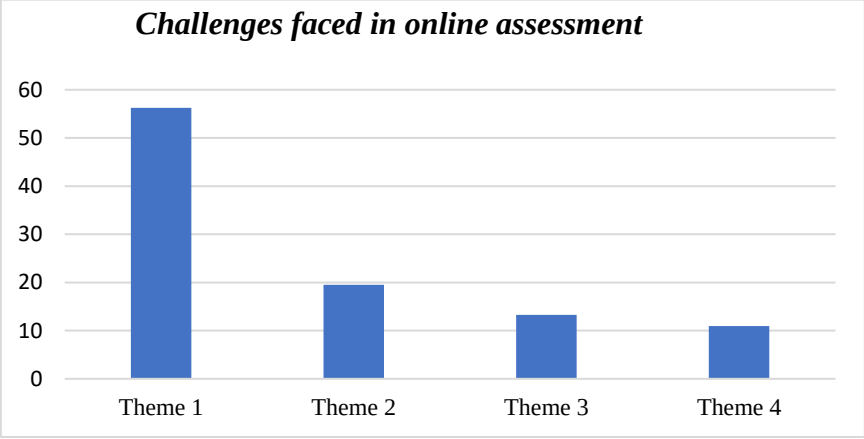

Figure 1: *present the challenges faced in online assessment*

Challenges in Awarding Sessional Marks During Online Assessment

Since universities are observing the semester system, it was pertinent to ask teachers how they award sessional marks during online teaching and assessment. Generally, sessional marks are based on certain tasks in the form of written assignments, presentations, quizzes, and class

participation. Respondents highlighted the same activities in their responses. In total, 58 themes were identified in relation to this theme. Three key themes were formed under this question: (a)Assignments (39.66%); (b) Online presentations (30.06); (c) Classroom participation (29.31%). As to giving assignments during online lectures, the majority of the respondents depend on assignments and presentation, as one of the respondents shared in the following way:

> *"During online classes, the main activity is to assign work to students, since their participation is limited in classes, we assign marks to such tasks so that students take the responsibility for submitting their work." (Teacher-13)*

Another teacher shared:

> *"At the beginning of online classes, we were not well equipped with the system and ways of engaging students online, thus we mainly rely on assignments and later we ask them to present those assignments in the form of presentations." (T-21)*

The following figure presents the percentages of themes occurred under this theme:

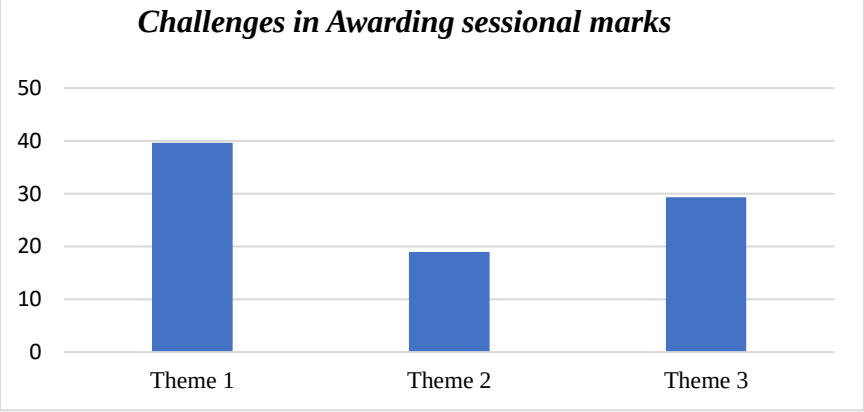

Figure 2: *Presents the ways of awarding sessional marks.*

Challenges in Dealing with Cheating and Plagiarized Material

During online classes, it was observed that students have been trying to explore ways to cheat and copy materials. The following question was asked to know the strategies of teachers to handle cheated and plagiarized work. In total, 44 codes were marked under this question. Two key themes were formulated on the basis of these questions; (a) Challenges in handling cheating and plagiarism (63.64%); (b) Applying higher order thinking strategies in exams (36.36%). First we will report the challenges faced by teachers in handling cheating and plagiarism in exams. The majority of the teachers highlighted that their students are involved in cheating and plagiarism and most of the time they take help from seniors, experts in the particular field, and they do exams in groups. There is a big challenge that we cannot see them during exams. They have the liberty to use such means. The following respondent claimed:

> *"Assessment is one of the challenging tasks and we are not expert enough to handle such issues. Moreover, there is no institutional policy for such matters. We usually identify their cheating and plagiarism in exams and in assigned tasks because there is no variation in results of low and high achievers." (Teacher-03)*

One of the respondents further shared:

> *"We know the tactics of students during exams and quizzes, but if we set strict standards no one will pass the exam and the results will be poor, and then teachers will be accountable for this." (Teacher-25)*

As to assessing students on higher order thinking skills, many teachers used this strategy to control and avoid cheating and plagiarism. The following respondent said:

> *"Exams should be based on higher order thinking skills but, of course, teachers should prepare their students accordantly before exams. A teacher should design questions to check the understanding and application level of students. This is the only way to control unfair means" (Teacher-23)*

The following figure presents these results:

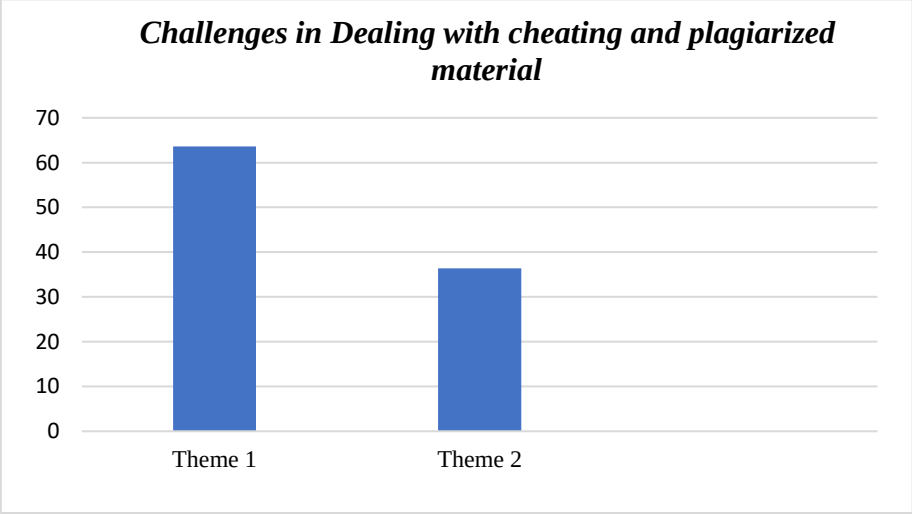

Figure 3: *Presents the ways of dealing with cheating and plagiarism.*

Results of Students in Online and Traditional Assessment

Taking into account the above mentioned question, teachers were also asked how they compare students' results in online and conventional assessment. There were in total 49 codes highlighted and two themes were formed to report results. We received the expected responses from teachers that there is a clear difference in both types of assessment. The following were the key themes: (a) Weaknesses in online assessment (59.18%); (b) Conventional assessment is reliable (40.82%):

The following figure presents these results.

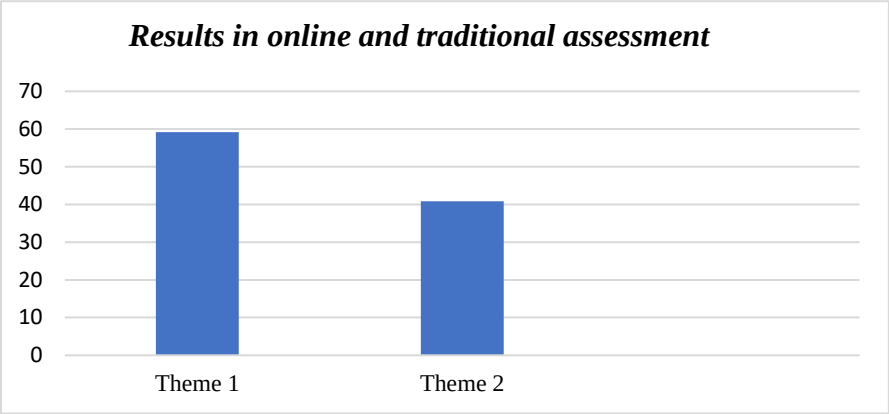

Figure 4: *Presents the results in online and traditional assessment*

The following interview chunks support these claims, an interviewee explained:

> *"So far, we are unable to develop a system for exams. There is no doubt students are getting significantly better results in online exams, which is challenging for quality education." (Teacher-22)*

Another responded shared:

> *"There is a clear difference in results of students in online learning. They use unfair means to solve exams." (Teacher-05)*

As to taking their opinion about conventional assessment if it is better than online, they shared their experience in the following way:

> *"I think there is no match between online and traditional assessment. Students have a lot of liberty in online exams. Teachers are unable to ensure transparency in exams." (Teacher-01)*

Effective Strategies to Improve Online Assessment

One of the objectives of this research was to identify ways to improve assessment during online learning. Teachers were presented with the following question; what measures can be taken to improve online assessment. We have a variety of responses in relation to these questions. The following is the list of themes identified after analysis: (a) open book exams (36.36%); (b) handling of students' malpractices (24.65%); (c) finding the best alternate during online assessment (56.25%); (d) better infrastructure of technology (55.07%); (e) training of teachers (43.71%). The following interview fragments are presented to support these claims: One of the teachers shared:

> *"Open-book exam strategy is the best strategy for online assessment. Questions should be based on higher order thinking skills rather than asking for absolute answers." (Teacher-30)*

As to handling the malpractices of students, one of teachers explained in the following way:

> *"Controlling such practices can only be possible through certain measures, avoiding giving recall questions, and try to bring variety. Practical and viva-voce exams can be added to confirm if students do their exam by themselves." (Teacher-27)*

We found the following response when teachers were asked about suggesting the best alternate for online assessment. The majority of the teachers suggest the following alternatives. One of the respondents said:

> *"In the science discipline, practical/experiment is not possible without a lab and proper equipment, thus we need to plan certain strategies to map their level of knowledge. Thus, students can demonstrate online, can give presentations and viva voce to show their knowledge and understanding" (Teacher-22)*

Teachers are also suggesting better technological infrastructure for effective and efficient learning. Many teachers also highlighted the need for teachers' training. They shared that if teachers are not ready to handle the system of online learning, how they can be an effective teacher. Following interview fragments presented their claims:

> *"Having a system for online learning is the first step towards effective learning. We, the regular universities, were never ready for such a challenging situation and we do not have a developed system for providing online learning. We require enough resources and equipment to develop an effective system." (Teacher-22)*

> *"Developing technological infrastructure without teacher training is worthless. We were never trained for such a teaching mode. Now we are looking forward to proper training and system. We do not know how long we have to teach like this, so better to get acquainted with the system" (Teacher-26)*

The following figure presents these results:

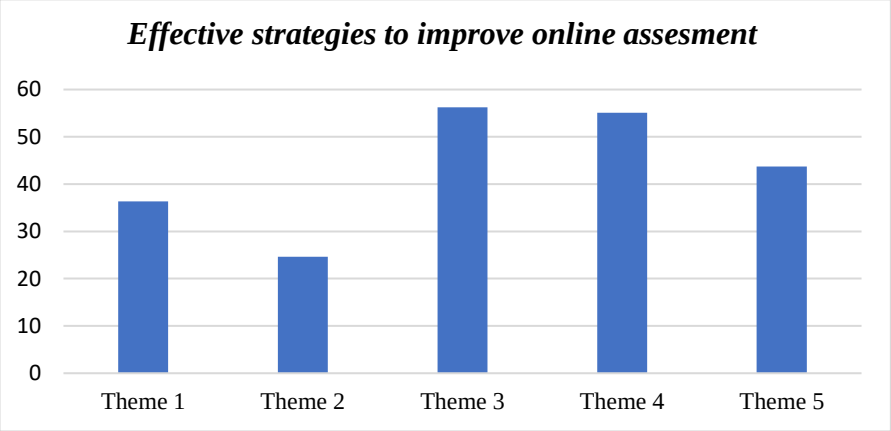

Figure 5: *presents the ways to improve online assessment*

DISCUSSION & CONCLUSION

This study intends to investigate the challenges and effective practices of assessment conducted during the Covid-19 outbreak. Although much data is not available yet to compare our findings specifically in the Pakistani higher education context, we tried to compare our study results with international research. Analysis shows a number of challenges hinder effective and efficient assessment in online education. These results are in accordance with the study findings of Adnan and Anwar (2020). They conducted their research in a Pakistani higher education context and found that online education is not useful without developing a proper system for online education. In its current state, both teachers and students are facing a lot of challenges and cannot cope with them.

Our study findings are also in line with the findings of Zhang et al., (2020). They conducted their research in a Chinese context and reached the same conclusion. Khairil and Mokshein (2018) conducted research to study online assessment practices in the 21st century and they concluded that if the online assessment process is properly developed and implemented, we can get effective results. But for this, both teachers and students should be trained enough to understand the online education system. These results also corroborate our study findings. Our findings revealed that students are involved in malpractices like cheating and plagiarism during formative and summative assessment activities, which is in line with the study results of Reedy, Pfitzner, Rook, and Ellis (2021). They conducted their research in the Saudi Arabian context during outbreaks and found that students usually take the benefit of being away from school. They use malpractices during exams, but these can be handled with a proper assessment system and giving awareness to teachers and students. Our study results also show that we do not have a proper system to teach and assess online and our teachers and students are not trained enough, which is one of the big hurdles in the quality of education in the online mode.

The findings are completely aligned with the research results of Shenoy et al., (2020). They conducted their research in an Indian higher education context and concluded similar findings. As to developing infrastructure for online education in universities for better results, our study findings completely matched with the study results of Gülbahar and Adnan (2020) who concluded that weak and poor technological infrastructure in online education mode is a big hurdle in

achieving the educational objectives. There should be a proper system for teaching and assessment and proper internet connection to run the system effectively. This is also aligned with the study results of Kaup, Jain, Shivalli, Pandey and Kaup (2020).

LIMITATIONS AND RECOMMENDATIONS

The main objective of this research was to investigate the challenges and effective practices in online assessment faced by university teachers during a pandemic outbreak. This study was conducted during the Covid-19 pandemic. Thus, we cannot escape from certain limitations. These limitations need to be stressed so that future research can focus on these neglected and limited elements to generalize the study findings at a maximum level. First, this study was designed using the qualitative methodology, using the quantitative method, and could provide an opportunity to get the quantitative data for better presentation of the results and facts. Moreover, this research only gathers data from university teachers. Collecting data from students could enrich the study findings and help to better understand the assessment strategies conducted during this challenging time. Consequently, analysis was also limited to thematic analysis, though we added a quantitative element for better representation of the results. Adopting the quantitative methodology could lead to adding other variables and expanding the data analysis approaches.

REFERENCES

Abbas, W., Ahmed, M., Khalid, R., & Yasmeen, T. (2017). Analyzing the factors that can limit the acceptability to introduce new specializations in higher education institutions. *International Journal of Educational Management*.

Abubakar, A.M., & Adeshola, I. (2019). Digital Exam and Assessments: A Riposte to Industry 4.0 In A. Elci, L.L. Beith, & A. Elci (Eds.). *Handbook of Research on Faculty Development for Digital Teaching and Learning* (pp. 245-263). Hershey PA: IGI Global. doi.org/10.4018/978-1-5225-8476-6.

Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive learning environments*, 1-13.

Albee, B. L. (2015). *Technology Use of Online Instructors With High Self-Efficacy A Multiple Case Study*.

Ali, N. U. (2020, April 2). Students disappointed with online teaching system amid COVID-19. Retrieved from Daily Times: https://dailytimes.com.pk/587446/students-disappointed-with-online-teaching-system-amid-covid-19/

Arora, A. K., & Srinivasan, R. (2020). Impact of pandemic COVID-19 on the teaching–learning process: A study of higher education teachers. *Prabandhan: Indian journal of management*, *13*(4), 43-56.

Bacow, L. (2020, July 14). ICE rescinds international order in response to Harvard-MIT suit. President News. https://www.harvard.edu/president/news/2020/ice-rescinds-international-order-responseto-harvard-mit-suit

Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (Covid-19) pandemic in Georgia. *Pedagogical Research*, 5(4), 1-9.

Bennett, S., Dawson, P., Bearman, M., Molloy, E., & Boud, D. (2017). How technology shapes assessment design: Findings from a study of university teachers. *British Journal of Educational Technology*, *48*(2), 672-682. doi.org/10.1111/bjet.12439

Biggs, J. (2003). Aligning teaching and assessing to course objectives. *Teaching and learning in higher education: New trends and innovations*, *2*(April), 13-17.

Boton, E. C., & Gregory, S. (2015). Minimizing attrition in online degree courses. Journal of Educators Online, 12(1), 62–90. Retrieved from https://www.thejeo.com/

Crawford, J., Butler-Henderson, K., Rudolph, J., & Glowatz, M. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Teaching and Learning* (JALT), 3(1).

Fiseha M. Guangul, Adeel H. Suhail, Muhammad. Khalit & Basim A. Khidhir (2020). Challenges of remote assessment in higher education in the context of COVID-19: a case study of Middle East College. Educational Assessment, Evaluation and Accountability https://doi.org/10.1007/s11092-020-09340-w

Gratz, E., & Looney, L. (2020). Faculty resistance to change: an examination of motivators and barriers to teaching online in higher education. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, *10*(1), 1-14.

Gülbahar, Y., & Adnan, M. (2020). Faculty professional development in creating significant teaching and learning experiences online. In *Handbook of research on creating meaningful experiences in online courses* (pp. 37-58). IGI Global.

Hsiao, Y. P., & Watering, G. D. (2020). Guide for choosing a suitable method for remote assessment considerations and options. *University of Twente*.

Joshi, A., Vinay, M., & Bhaskar, P., (2020). Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. Emerald Publishing Limited. 1741-5659. DOI 10.1108/ITSE-06-2020-0087

Kaup, S., Jain, R., Shivalli, S., Pandey, S., & Kaup, S. (2020). Sustaining academics during COVID-19 pandemic: the role of online teaching-learning. *Indian Journal of Ophthalmology*, *68*(6), 1220.

Kaur, G. (2020). Digital Life: Boon or bane in teaching sector on COVID-19. *CLIO an Annual Interdisciplinary Journal of History*, 6(6), 416-427.

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems, 46*(1). doi.org/10.1177%2F0047239516661713

Khairil, L. F., & Mokshein, S. E. (2018). 21st Century Assessment: Online Assessment. *International Journal of Academic Research in Business and Social Sciences, 8*(1), 659–672.

Lederman, D. (2020, April 22). How teaching changed in the (forced) shift to remote learning. Inside Higher Ed. Retrieved from https://www.insidehighered.com/digital-learning/article/2020/ 04/22/how-professors-changed-their-teaching-springs-shift-remote

Levine, J., & Pazdernik, V. (2018). Evaluation of a four-prong anti-plagiarism program and the incidence of plagiarism: a five-year retrospective study. *Assessment and Evaluation in Higher Education, 43*(7), 1094-1105. doi.org/10.1080/02602938.2018.1434127

Luo L, Cheng X, Wang S, Zhang J, Zhu W, Yang J, et al, (2017) Blended learning with Moodle in medical statistics: An assessment of knowledge, attitudes and practices relating to e-learning. *BMC Med Educ [Internet* 19;17(1):170. [cited 2020 Apr 28] Available from: http://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-017-1009-x . [PMC free article] [PubMed] [Google Scholar

Myyry, L., & Joutsenvirta, T. (2015). Open-book, open-web online examinations: developing examination practices to support university students' learning and self-efficacy. *Active Learning in Higher Education, 16*(2), 119-132. doi.org/10.1177%2F1469787415574053

Okada, A., Mendonca, M., & Scott, P. (2015). Effective web videoconferencing for proctoring online oral exams: a case study at scale in Brazil. Open Praxis, 7, 227–242.

Page, L., & Cherry, M. (2018). Comparting trends in graduate assessment: face-to-face vs. online learning. *Assessment Update, 30*(5), 3-15. doi.org/10.1002/au.3014

Ragusa, A. T., & Crampton, A. (2018). Sense of connection, identity and academic success in distance education: Sociologically exploring online learning environments. Rural Society, 27, 25–142. doi:10.1080/10371656.2018.1472914

Reedy, A., Pfitzner, D., Rook, L., Ellis, L. (2021). Responding to the COVID-19 emergency: student and academic staff perceptions of academic integrity in the transition to online exams at three Australian universities. *Int J Educ Integr* 17(1). https://doi. org/10.1007/s40979-021-00075-9

Rennie, F., & Morrison, T. (2013). *E-learning and social networking handbook: Resources for higher education*. Routledge. https://doi.org/10.4324/9780203120279

Rutgers. (2020). Remote exams and assessments. Retrieved from https://sasoue.rutgers.edu/teaching-learning/ remote-exams-assessment#special-advice-for-open-book-assessment-in-quantitative-courses

Sangster, A., Stoner, G., & Flood, B. (2020). Insights into accounting education in a COVID-19 world. *Accounting Education, 29*(5), 431-562.

Shenoy, V., Mahendra, S., & Vijay, N. (2020). COVID 19 lockdown technology adaption, teaching, learning, students' engagement and faculty experience. *Mukt Shabd Journal, 9*(4), 698-702.

Verma, G., Campbell, T., Melville, W., & Park, B.Y. (2020), "Science teacher education in the times of the COVID-19 pandemic".

Wang, T. H., Chiu, M. H., Lin, J. W., & Chou, C. C. (2013). Diagnosing students' mental models via the Web-Based Mental Models Diagnosis system. British Journal of Educational Technology, 44 (2), E45-E48. https://doi.org/10.1111/j.1467-8535.2012.01328.x

World Bank. (2020). Remote Learning and COVID-19 The use of educational technologies at scale across an education system as a result of massive school closings in response to the COVID-19 pandemic to enable distance education and online learning. Retrieved from file:///E:/PC/Rapid-Response-Briefing-Note-Remote-Learning-and-COVID-19-Outbreak.pdf

Yates, S. D. (2017). Love, honor, and "light bulbs": Investigating adjunct faculty identity and preparation for online teaching at a Southeastern research university [Doctoral dissertation, University of Alabama]. https://ir.ua.edu/bitstream/handle/123456789/3357/file_1.pdf

Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak: Multidisciplinary digital publishing institute.